

Effect of potassium channel blocker 4-aminopyridine pretreatment on the 6-OHDA-induced Parkinson's disease in rats

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*Abstract

Background: Nuclease and caspase enzymes activities which promote death signals and lead to apoptosis are dependent to potassium ions.

Objective: The aim of this study was to determine the effect of 4-aminopyridine (4-AP) potassium channel blocker on the animal model of Parkinson's disease.

Methods: This experimental study was performed in Qazvin University of Medical Sciences, 2013. Male Rats were received different doses of 4-AP twice daily from half an hour before injection of 6-hydroxydopamine (6-OHDA) to 7 or 15 days after that. 6-OHDA was injected into medial forebrain bundle (MFB) in acute model groups and into striatum in chronic model groups. The severity of Parkinsonism was assessed by standard behavioral methods. Data were analyzed using Kruskal-Wallis and Mann Whitney U tests.

Findings: In acute model groups, administration of 0.5 mg/kg 4-AP (n=9) had no remarkable effect on behavioral symptoms, but 1 mg/kg 4-AP (n=8) significantly reduced the severity of apomorphine-induced rotations and improved motor learning in rotarod test. In chronic model groups, although 1 mg/kg 4-AP (n=7) significantly reduced the severity of rotations and improved motor learning, but 0.5 mg/kg 4-AP (n=8) was more effective.

Conclusion: Pretreatment with 4-AP can reduce 6-OHDA-induced dopaminergic neuron death. Since the chronic model of 6-OHDA is more similar to Parkinson's disease in human, the low dose of 4-AP is recommended for treatment of this disease.

Keywords: Parkinson Disease, Potassium Channel Blockers, Oxidopamine, Substantia Nigra

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